

RMOSA

Rocky Mountain Section of the Optical Society of America

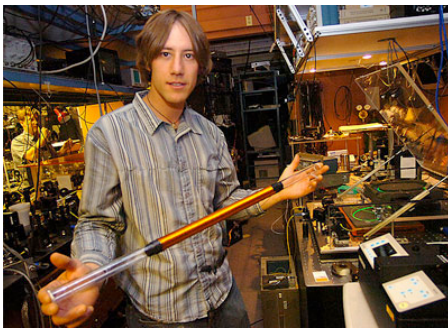
Joint RMOSA/IEEE-LEOS Seminar & Meeting

Thursday, September 25, 2008

Refreshments: 7:00 p.m. :: Seminar: 7:30 p.m.

[BUS 340 Leeds Business, CU, Boulder](#)

Cavity-enhanced molecular spectroscopy using optical frequency combs



Mike Thorpe holds a molecule detection chamber next to his optical comb spectroscopy setup in the Ye labs.

Michael J. Thorpe
University of Colorado / JILA

Abstract: Cavity-enhanced optical frequency comb spectroscopy (CE-OFCS) combines broad spectral bandwidth, high spectral resolution, precise frequency calibration, and ultra-high detection sensitivity, all in one experimental platform based on an optical frequency comb interacting with a high-finesse optical cavity. In this talk, I will discuss the principles of cavity-enhanced optical frequency comb spectroscopy including the properties of frequency combs and optical cavities that are relevant to CE-OFCS systems. I'll present methods for characterizing cavity-comb interactions and achieving simultaneous broad bandwidth and high resolution detection of the cavity transmitted beam. Measurements are presented that fully characterize the detection sensitivity, resolution, and spectral coverage of several CE-OFCS systems. Finally, I'll present a series of experimental measurements on trace gas detections, human breath analysis, and characterization of cold molecular beams that demonstrate the real-time detection and identification of many molecular species including their quantum state distributions in a massively parallel fashion.

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